**Intermolecular Forces**

-Intermolecular forces are the forces that exist between covalent molecules. The magnitude of these intermolecular forces determines properties like melting or boiling point, or solubility in a certain substance. We can think of intermolecular forces almost like we do ionic bonds: an attraction between (+) and (-) charges. However in the case of covalent molecules, the (+) and (-) charges come from specific regions of the molecules, AND, the (+) and (-) charges are only partial.

-The (+) and (-) charges in regions of covalent compounds come from how the molecule is composed (what bonds are present). In a covalent bond, neighboring atoms will SHARE electrons between the two. Each atom will contribute one or more electrons in this process, creating single, double or triple bonds. The electrons shared in the bond will be orbiting BOTH atoms, but they will spend more time at the more electronegative atom. This ends up creating a partial (-) charge on the more electronegative atom and a partial (+) charge on the less electronegative atom. For example, water (H2O) is composed of 2 O-H bonds. In this case, oxygen is the more electronegative atom in these bonds. This means that the oxygen region in the molecule will have a slight (-) charge, while the hydrogens will have slight (+) charges.

-This separation of charge throughout the molecule (charge distribution) causes other molecules with (+) or (-) charges to interact with the (-) or (+) charges from neighboring molecules.

-If two atoms in a covalent bond have similar electronegativities, they will share their electrons equally. This results in no separation of charge. For example, Carbon and Hydrogen have very similar electronegativities. These types of bonds will not create a separation of charge.

-When a covalent molecule has a significant separation of charge (+ on one side and – on the other), it is said to be a “polar” covalent molecule. If a molecule does not have a significant separation of charge, it is said to be a “nonpolar” covalent molecule.

